

WHAT IS CLAIMED IS:

1. A heat transfer device comprising:
a heat pipe, the heat pipe having a hollow interior partially filled with a
5 vaporizable liquid; and
a threaded outer surface covering at least a portion of the heat pipe, wherein the
threaded outer surface is configured for coupling the heat pipe into an
aperture having a complementary threaded inner surface.
- 10 2. The heat transfer device as recited in claim 1, wherein an outer surface of the heat
pipe comprises the threaded outer surface.
3. The heat transfer device as recited in claim 1, wherein the threaded outer surface
comprises a cap, the cap including a first cavity configured for receiving the heat
15 pipe.
4. The heat transfer device as recited in claim 3, wherein the cap includes a second
cavity configured for receiving an assembly tool.
- 20 5. The heat transfer device as recited in claim 4, wherein the assembly tool is an
Allen wrench.
6. The heat transfer device as recited in claim 5, wherein the Allen wrench is a
torque-controlled Allen wrench.
- 25 7. The heat transfer device as recited in claim 3, wherein the cap is formed of a
thermally conductive material.

8. The heat transfer device as recited in claim 1, wherein the threaded outer surface includes a threaded sleeve, wherein the threaded sleeve includes a hollow portion for receiving the heat pipe.
- 5 9. The heat transfer device as recited in claim 8, wherein the threaded sleeve includes a plurality of flat areas.
10. The heat transfer device as recited in claim 8; wherein the threaded sleeve is formed of a thermally conductive material.
- 10 11. A thermal control apparatus for an electronic system, the thermal control apparatus comprising:
a heat spreader formed of a thermally conductive material and mountable in proximity to one or more electronic devices on a printed circuit board (PCB), wherein the heat spreader includes at least one aperture having a threaded inner surface; and
15 a heat pipe having a threaded outer surface positioned within the at least one aperture of the heat spreader.
- 20 12. The thermal control apparatus as recited in claim 11, wherein the heat pipe includes a hollow interior partially filled with a vaporizable liquid.
13. The thermal control apparatus as recited in claim 11, wherein an outer surface of the heat pipe comprises the threaded outer surface.
- 25 14. The thermal control apparatus as recited in claim 11, wherein the threaded outer surface comprises a cap, the cap including a first cavity configured for receiving the heat pipe.

15. The thermal control apparatus as recited in claim 14, wherein the cap includes a second cavity configured for receiving an assembly tool.
- 5 16. The thermal control apparatus as recited in claim 15, wherein the assembly tool is an Allen wrench.
17. The thermal control apparatus device as recited in claim 16, wherein the Allen wrench is a torque-controlled Allen wrench.
- 10 18. The thermal control apparatus as recited in claim 14, wherein the cap is formed of a thermally conductive material.
19. The thermal control apparatus as recited in claim 14, wherein the threaded outer surface comprises a threaded sleeve, wherein the threaded sleeve includes a hollow portion for receiving the heat pipe.
- 15 20. The thermal control apparatus as recited in claim 19, wherein the threaded sleeve includes a plurality of flat areas.
- 20 21. The thermal control apparatus as recited in claim 19, wherein the threaded sleeve is formed of a thermally conductive material.
22. The thermal control apparatus as recited in claim 11, wherein the heat spreader includes a plurality of apertures, wherein each of the plurality of apertures includes a threaded inner surface, and wherein the thermal control apparatus further includes a plurality of heat pipes, wherein each of the plurality of heat pipes is positioned within one of the plurality of apertures.
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23. An electronic assembly comprising:
a printed circuit board (PCB);
one or more electronic devices mounted to the PCB; and
a thermal control apparatus coupled to the PCB, wherein the thermal control
5 apparatus includes:
a heat spreader formed of a thermally conductive material and mounted in
proximity to at least one of the one or more electronic devices,
wherein the heat spreader includes at least one aperture having a
threaded inner surface; and
10 a heat pipe having a threaded outer surface positioned within the at least
one aperture of the heat spreader;
wherein at least a portion of the thermal control apparatus is in contact with the at
least one of the one or more electronic devices.
- 15 24. The electronic assembly as recited in claim 23, wherein at least a portion of the
heat pipe is in contact with a surface of the at least one of the one or more
electronic devices.
- 20 25. The electronic assembly as recited in claim 23, wherein at least a portion of the
heat spreader is in contact with a surface of the at least one of the one or more
electronic devices.
26. The electronic assembly as recited in claim 23, wherein the heat pipe includes a
hollow interior partially filled with a vaporizable liquid.
- 25 27. The electronic assembly as recited in claim 23, wherein an outer surface of the
heat pipe comprises the threaded outer surface.

28. The electronic assembly as recited in claim 23, wherein the threaded outer surface comprises a cap, the cap including a first cavity configured for receiving the heat pipe.
- 5 29. The electronic assembly as recited in claim 28, wherein the cap includes a second cavity configured for receiving an assembly tool.
30. The electronic assembly as recited in claim 29 wherein the assembly tool is an Allen wrench.
- 10 31. The electronic assembly device as recited in claim 30, wherein the Allen wrench is a torque-controlled Allen wrench.
32. The electronic assembly as recited in claim 28, wherein the cap formed of a thermally conductive material.
- 15 33. The electronic assembly as recited in claim 23, wherein the threaded outer surface comprises a threaded sleeve, wherein the threaded sleeve includes a hollow area for receiving the heat pipe.
- 20 34. The electronic assembly as recited in claim 33, wherein the threaded sleeve includes a plurality of flat areas.
35. The electronic assembly as recited in claim 33, wherein the threaded sleeve is formed of a thermally conductive material.
- 25 36. The electronic assembly as recited in claim 23, wherein the heat spreader includes a plurality of apertures, wherein each of the plurality of apertures includes a threaded inner surface, and wherein the thermal control apparatus further includes

a plurality of heat pipes, wherein each of the plurality of heat pipes is positioned within one of the plurality of apertures.